NOAA's Hurricane Season Outlooks

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Outlooks made in Collaboration with

National Hurricane Center

Hurricane Research Division

Central Pacific Hurricane Center

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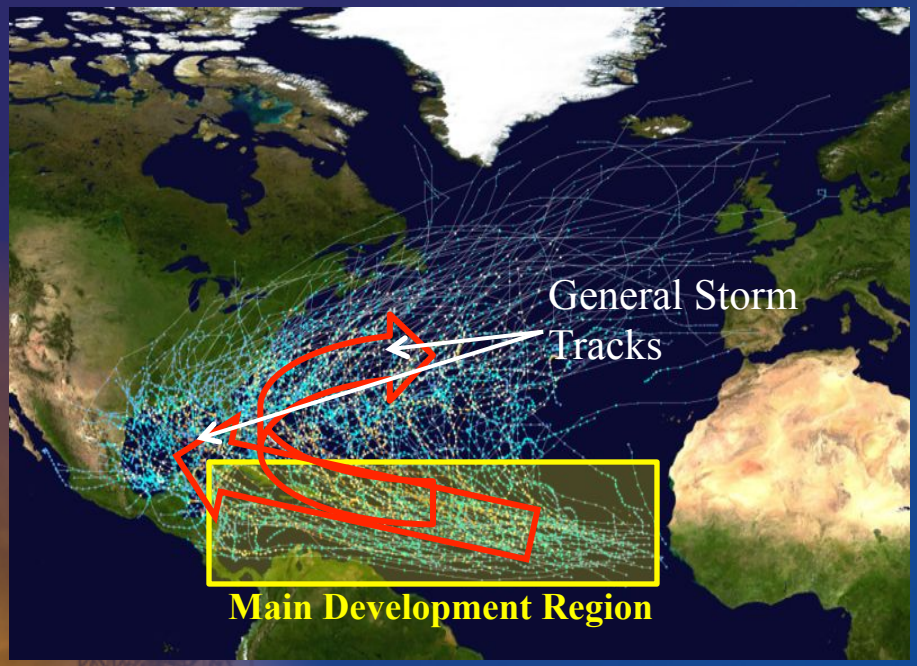
www.cpc.ncep.noaa.gov/products/hurricane

Outline

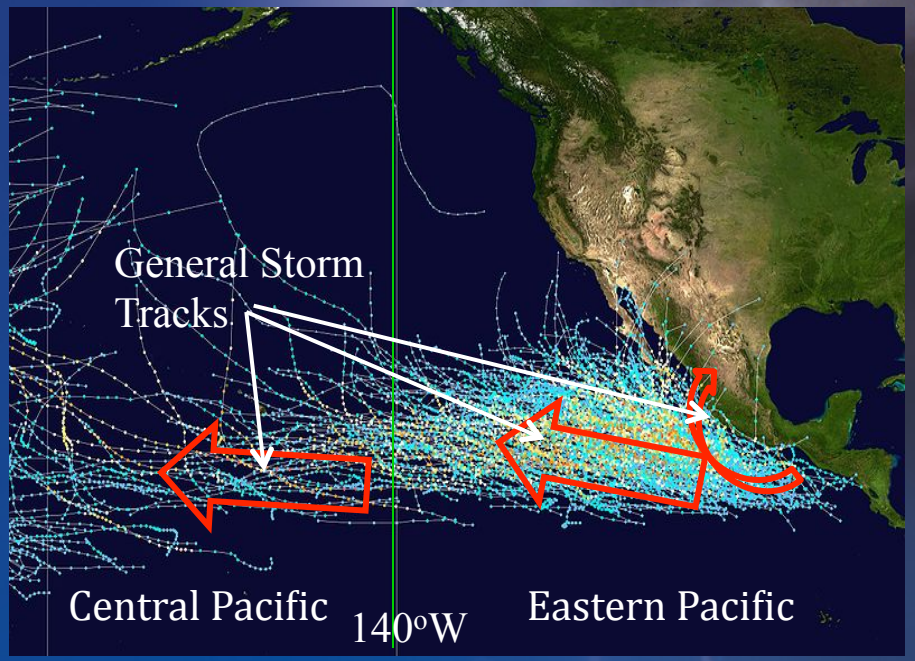
1. NOAA's hurricane outlook regions
2. Ingredients for a hurricane
3. Scientific basis behind the outlooks
4. Climate Patterns influencing Atlantic hurricane season strength
5. High- and low-activity eras for Atlantic hurricanes

NOAA Seasonal Hurricane Outlook Regions

Atlantic Basin Storm Tracks



Central and Eastern North Pacific
Storm Tracks



Background Figure
Courtesy of Wikipedia

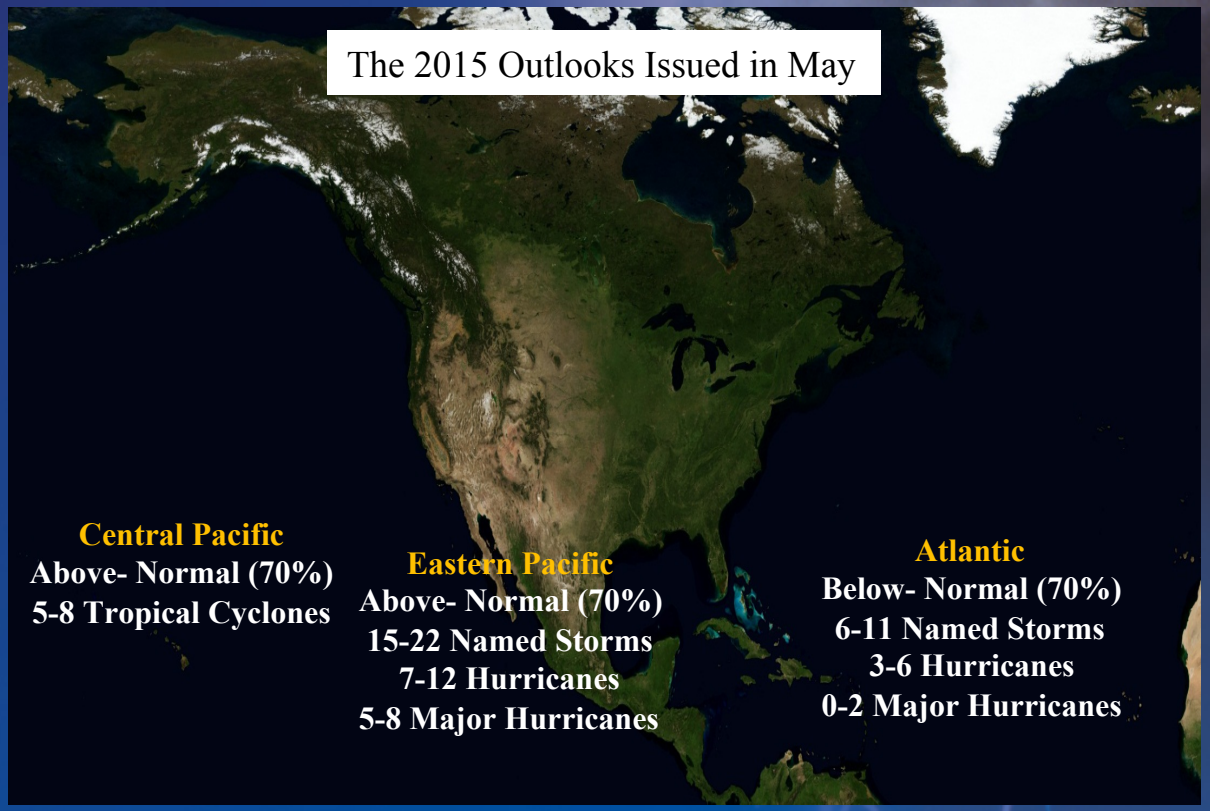
Hurricane Basin	Season Length	Peak Activity
Atlantic	1 Jun – 30 Nov	Aug-Oct
East Pacific	15 May – 30 Nov	Jul-Sep
Central Pacific	1 Jun – 30 Nov	Jul-Sep

NOAA Seasonal Hurricane Outlook Regions

NOAA issues probabilistic outlooks of overall season strength.

Forecast parameters:

- Overall season strength
- Likely ranges (70% probability) of activity

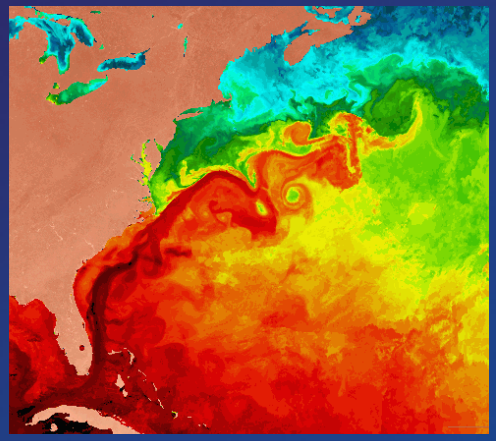


Updated Atlantic outlook to be issued August 6th

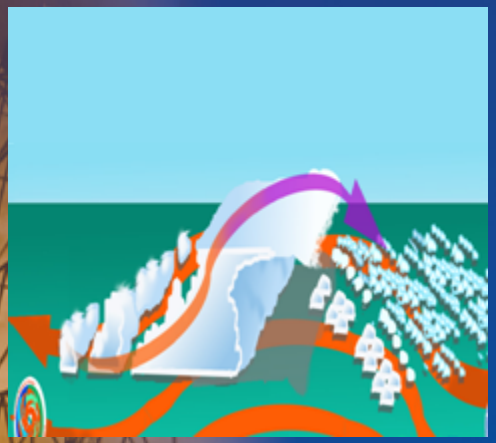
Outlooks ARE NOT a seasonal hurricane landfall prediction, and do not predict levels of activity for any particular region.

Ingredients for a Hurricane

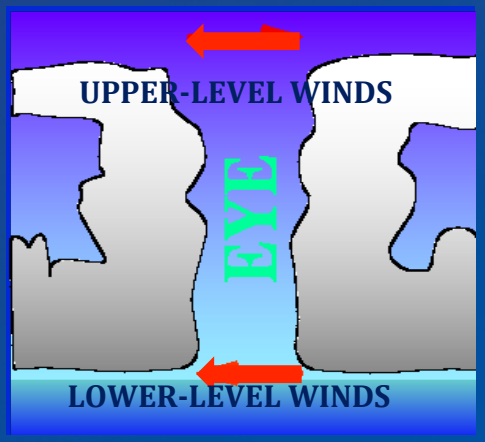
Warm Ocean



Pre-Existing "Trigger" Cloud systems from Africa



Not too much Vertical Wind Shear



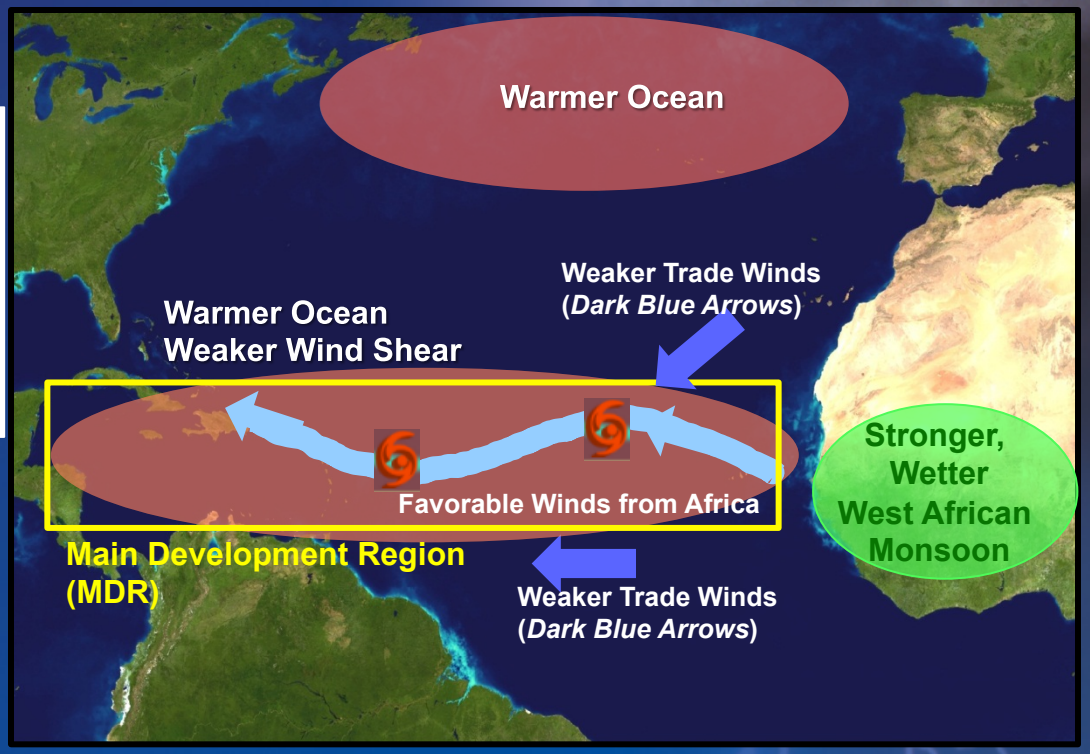
Vertical wind shear refers to the change in wind speed and direction between the lower and upper atmosphere.

Scientific Basis for Making Seasonal Hurricane Outlooks

Active/ inactive seasons often result from coherent set of atmospheric conditions which are strongly controlled by tropical climate patterns. Not Random.

Map shows typical conditions associated with active Atlantic hurricane seasons and decades.

Opposite conditions produce much weaker hurricane seasons.

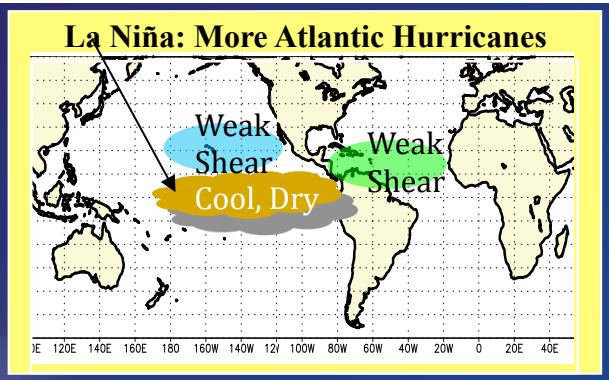


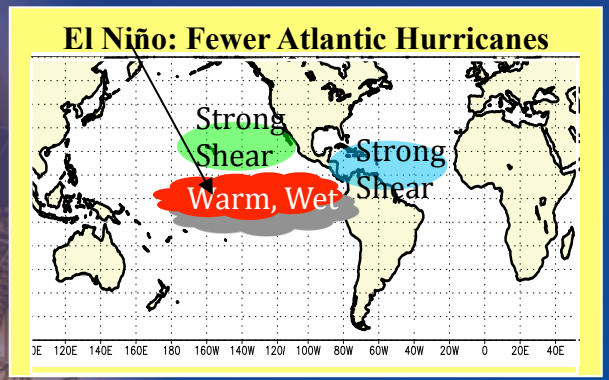
This inter-related set of conditions has strong links to tropical climate patterns. There is an extensive monitoring program help predict these conditions.

Climate Patterns Influencing Atlantic Hurricane Season

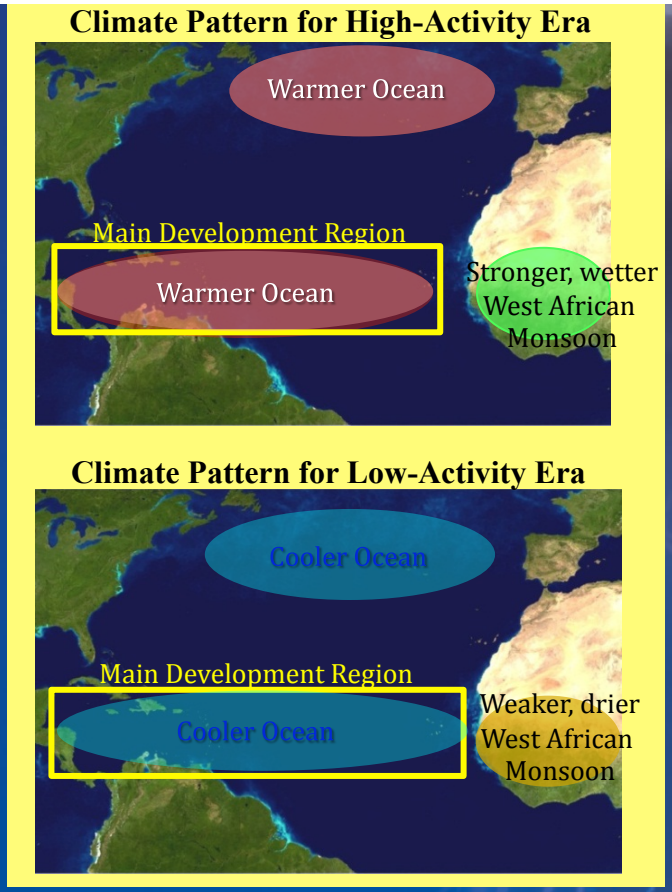
Predicting these climate patterns and their combined impacts is the underlying basis for making NOAA's seasonal hurricane outlooks.

El Niño and La Niña : Yearly changes in Atlantic hurricane activity





Atlantic Multi-Decadal Oscillation (AMO): 25-40 year fluctuations in Atlantic hurricane activity

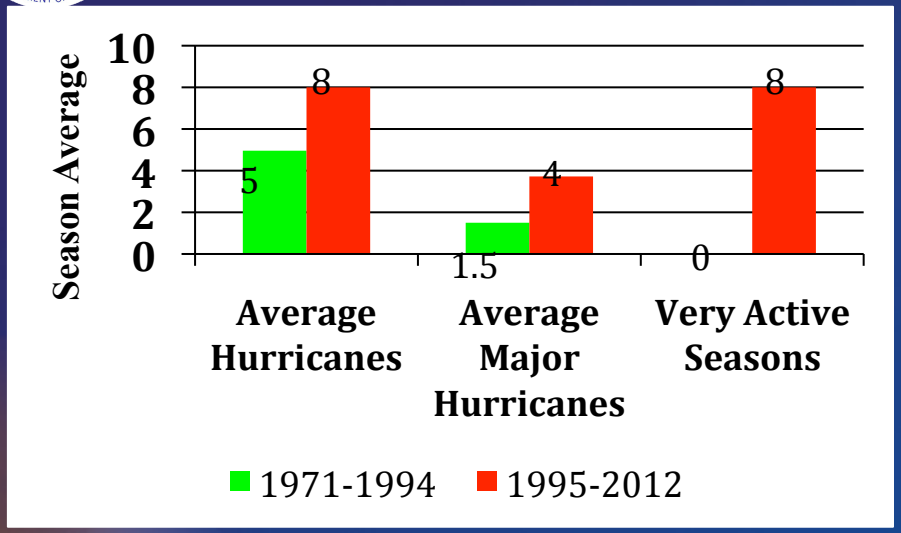


1950-1970, 1995-pres?

1971-1994

Seasonal outlooks also reflect current and predicted regional conditions (e.g., Atlantic temperatures, trade winds, vertical wind shear).

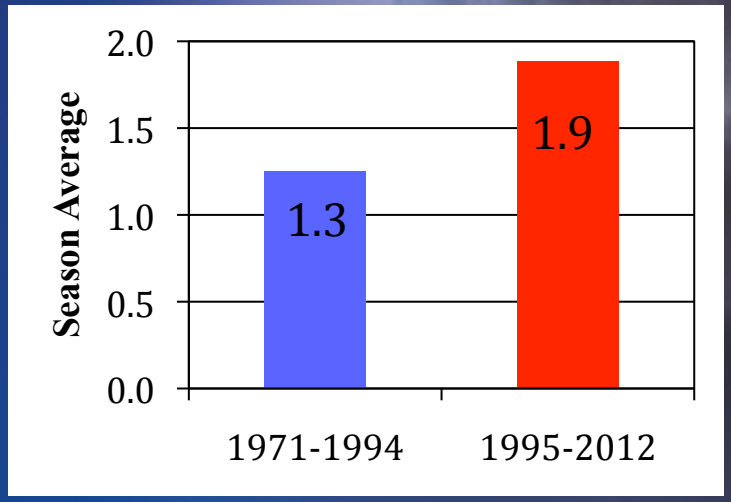
Comparing High- and Low-Activity Eras



Compared to the previous low-activity era ,

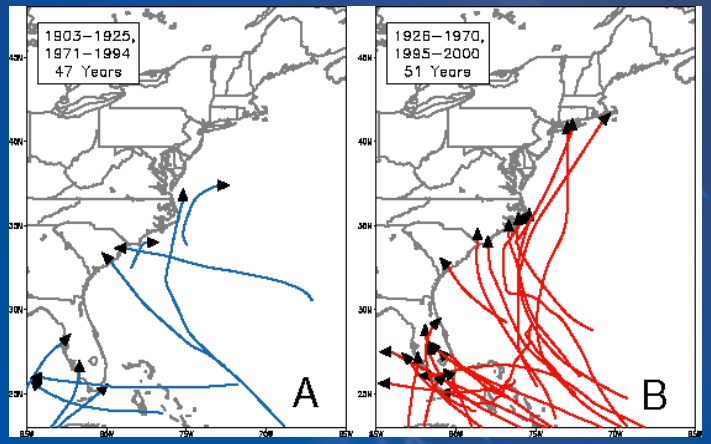
- Hurricanes have increased by 60% (from 5 to 8),
- Major hurricanes more than doubled
- 8 of 18 seasons "very active" compared to none during 1971-94

U.S. Hurricane Landfalls



Since 1995 the average number of U.S. hurricane landfalls per season has increased by nearly a 50% compared to 1971-1994.

Atlantic Coast
Major Hurricanes



Low Activity Eras

High Activity Eras (thru 2000)

Summary

1. Predicting two main tropical climate patterns provides a strong scientific basis for making seasonal hurricane outlooks. Seasonal activity is not Random.
2. Since Katrina, advances have occurred in all aspects of the seasonal hurricane outlooks
   - Monitoring and analysis
   - Research and understanding of climate patterns and their combined impacts
   - Huge advances in climate model development and model sophistication
3. Significant increases in skill of outlooks since 2008

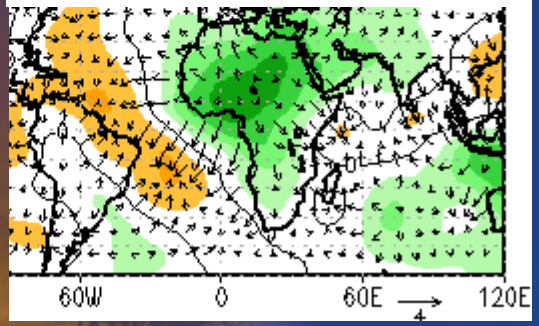
Making NOAA's Seasonal Hurricane Outlook

Predict key climate patterns, wind/ ocean temperature patterns, and their impacts.

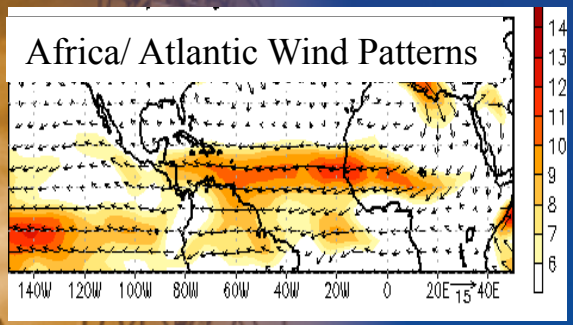
Accomplished using observations, El Niño/ La Niña forecasts, sophisticated new climate models since 2008.

Observations

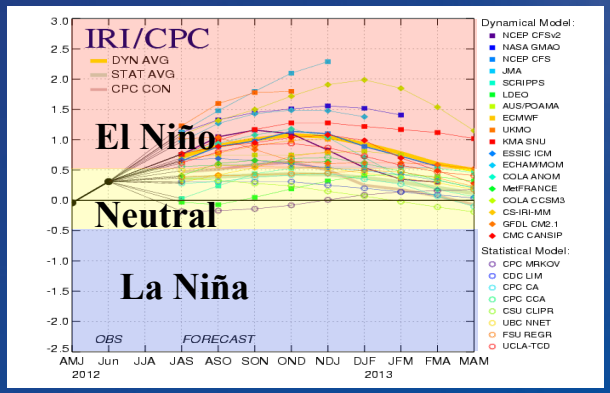
West African Monsoon Strength



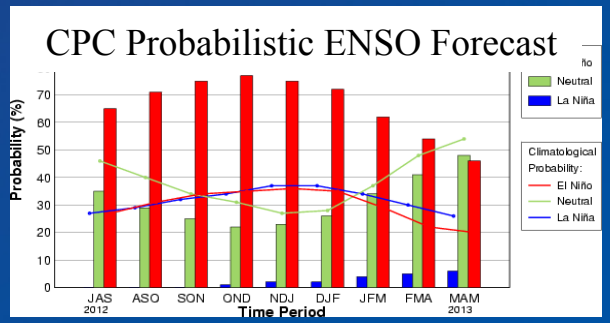
Africa/ Atlantic Wind Patterns



El Niño/La Niña Predictions

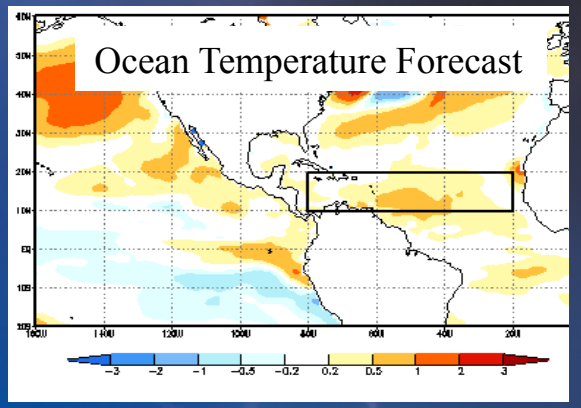


CPC Probabilistic ENSO Forecast



Climate Model Forecasts

Ocean Temperature Forecast



Vertical Wind Shear Forecast